Materials Engineering Branch

TIP*

No. 102 Dimensional Changes of 17-7 PH Stainless Steel

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The designer that uses 17-7PH stainless steel should be aware of the dimensional changes that occur during heat treatment. The resultant dimensional change (expansion or contraction) is an important factor in laying out parts to be fabricated in the solution treated condition (condition A) and subsequently heat-treated.

The three aging heat treatments that are available for 17-7 and the resulting dimensional changes are as follows:

Heat Treatment	Condition	Type	Dimensional Change, in/in
1400°F for 1.5 hr & air coo1⇒T +1050°F for1.5 hr & air coo1 ⇒H1050	TH1050	Expansion	0.004
1750°F for 10 min & air cool⇒A 1750°±100°F for 8 hr⇒R + 950°F for 1 hr⇒H950	RH950	Expansion	0.004
Cold work sheet or cold draw wire to 60%CW⇒C + 900°F for 1 hr ⇒H900	CH900	Contraction	0.0005

TH and RH conditions are used with various age hardening temperatures. Caution should be exercised in using the TH temper for subzero temperature applications due to possible additional dimensional increases.

This alloy has high resistance to stress corrosion cracking (SCC) only when used in the CH900 heat-treated condition. Other tempers are susceptible to SCC and require submittal of an MUA (Material Usage Agreement) per MSFC-STD-3029. To avoid problems related to SCC with this and other alloys, the reader is referred to MSFC-STD-3029, titled "Design Criteria for Controlling Stress Corrosion Cracking."